

CLAIM AMENDMENT

Please amend the claims in accordance with the following listing.

Listing of Claims:

Claims 1 and 2 (cancelled).

3. (new) A method of maintaining a file system stored in a memory and on a storage system that includes one or more hard disks, said method comprising steps of:

maintaining an on-disk root inode on said storage system, said on-disk root inode pointing directly and indirectly to a first set of blocks on said storage system that store a first consistent state of said file system; and

maintaining an incore root inode in said memory, said incore root inode pointing directly and indirectly to buffers in said memory and a second set of blocks on said storage system, said buffers and said second set of blocks storing data and metadata for a second consistent state of said file system, said second set of blocks including at least some blocks in said first set of blocks, with changes between said first consistent state and said second consistent state being stored in said buffers and in ones of said second set of blocks not pointed to by said on-disk inode.

4. (new) A method as in claim 3, wherein said file system on said storage system always moves atomically from said first consistent state to said second consistent state.

5. (new) A method as in claim 4, wherein said file system on said storage system

moves atomically to said second consistent state by flushing said changes from said buffers to said storage system before updating said on-disk root inode with information from said in-code root inode.

6. (new) A method as in claim 5, wherein updating said on-disk root inode further comprises updating said on-disk root inode and then a copy of said on-disk root inode such that if updating said on-disk root inode is interrupted, said copy of said on-disk root inode still points to said first consistent state of said file system.

7. (new) A method as in claim 3, further comprising the step of creating a snapshot of said file system by copying only said on-disk root inode.

8. (new) A method as in claim 7, wherein when said snapshots is created, said snapshot and said file system share said blocks on said storage system.

9. (new) A method as in claim 3, further comprising the step of creating plural snapshots of said file system by copying only said on-disk root inode at different times.

10. (new) A method as in claim 9, wherein when each one of said plural snapshots is created, each one of said snapshots and said file system share said blocks on said storage system.

11. (new) A device comprising:

a processor;
a memory; and
a storage system including one or more hard disks;
wherein said memory and said storage system store a file system; and
wherein said memory also stores information including instructions executable by said processor to maintain said file system, the instructions including steps of (a) maintaining an on-disk root inode on said storage system, said on-disk root inode pointing directly and indirectly to a first set of blocks on said storage system that store a first consistent state of said file system, and (b) maintaining an incore root inode in said memory, said incore root inode pointing directly and indirectly to buffers in said memory and a second set of blocks on said storage system, said buffers and said second set of blocks storing data and metadata for a second consistent state of said file system, said second set of blocks including at least some blocks in said first set of blocks, with changes between said first consistent state and said second consistent state being stored in said buffers and in ones of said second set of blocks not pointed to by said on-disk inode.

12. (new) A device as in claim 11, wherein said file system on said storage system always moves atomically from said first consistent state to said second consistent state.

13. (new) A device as in claim 12, wherein said file system on said storage system moves atomically to said second consistent state by flushing said changes from said buffers to said storage system before updating said on-disk root inode with information from said in-code root

inode.

14. (new) A device as in claim 13, wherein updating said on-disk root inode further comprises updating said on-disk root inode and then a copy of said on-disk root inode such that if updating said on-disk root inode is interrupted, said copy of said on-disk root inode still points to said first consistent state of said file system.

15. (new) A device as in claim 11, wherein the instructions further comprise the step of creating a snapshot of said file system by copying only said on-disk root inode.

16. (new) A device as in claim 15, wherein when said snapshot is created, said snapshot and said file system share said blocks on said storage system.

17. (new) A device as in claim 11, wherein the instructions further comprise the step of creating plural snapshots of said file system by copying only said on-disk root inode at different times.

18. (new) A device as in claim 17, wherein when each one of said plural snapshots is created, each one of said snapshots and said file system share said blocks on said storage system.

19. (new) An article of manufacture comprising a machine-readable storage medium

storing instructions executable by a processor coupled to a memory and to a storage system, said storage system comprising one or more hard disks, said memory and said storage system storing a file system, wherein the instructions, when executed by the processor, cause the processor to (a) maintain an on-disk root inode on said storage system, said on-disk root inode pointing directly and indirectly to a first set of blocks on said storage system that store a first consistent state of said file system, and (b) maintain an incore root inode in said memory, said incore root inode pointing directly and indirectly to buffers in said memory and a second set of blocks on said storage system, said buffers and said second set of blocks storing data and metadata for a second consistent state of said file system, said second set of blocks including at least some blocks in said first set of blocks, with changes between said first consistent state and said second consistent state being stored in said buffers and in ones of said second set of blocks not pointed to by said on-disk inode.

20. (new) An article of manufacture as in claim 19, wherein the instructions further cause the processor to move atomically said file system on said storage system from said first consistent state to said second consistent state.

21. (new) An article of manufacture as in claim 20, wherein the instructions cause the processor to move atomically said file system on said storage system to said second consistent state by flushing said changes from said buffers to said storage system before updating said on-disk root inode with information from said in-code root inode.

22. (new) An article of manufacture as in claim 21, wherein updating said on-disk root

inode comprises updating said on-disk root inode and then a copy of said on-disk root inode such that if updating said on-disk root inode is interrupted, said copy of said on-disk root inode still points to said first consistent state of said file system.

23. (new) An article of manufacture as in claim 19, wherein the instructions further cause the processor to create a snapshot of said file system by copying only said on-disk root inode.

24. (new) An article of manufacture as in claim 23, wherein the instructions cause the processor to create said snapshot so that said snapshot and said file system share said blocks on said storage system when said snapshot is created.

25. (new) An article of manufacture as in claim 19, wherein the instructions further cause the processor to create plural snapshots of said file system by copying only said on-disk root inode at different times.

26. (new) An article of manufacture as in claim 25, wherein the instructions, when executed by the processor, cause the processor to create each one of said plural snapshots so that each one of said snapshots and said file system share said blocks on said storage system when each one of said plural snapshots is created.